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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,948	11/20/2001	Kun-Lin Wu	UMC-98-254 CON2	4310
25235	7590	04/27/2004	EXAMINER	
HOGAN & HARTSON LLP ONE TABOR CENTER, SUITE 1500 1200 SEVENTEENTH ST DENVER, CO 80202			YEVSIMOV, VICTOR V	
			ART UNIT	PAPER NUMBER
			2825	

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/990,948

Applicant(s)

WU ET AL.

Examiner

Victor V Yevsikov

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 28-64 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 45-64 is/are allowed.
6) ☒ Claim(s) 28-44 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 20 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 28 and 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Emesh et al. (US 5,452,178) in view of Witek et al. (US 5,340,754).

With respect to claims 28 and 44 Emesh teaches a method for chemical-mechanical polishing process, comprising the steps of:

forming a first conductive layer (56,58) and a dielectric layer 66 over a semiconductor substrate;

polishing the dielectric layer to form a substantially planar surface (fig. 9).

Emesh discloses the features out lined above, but does not show exactly a method of forming a dielectric cap layer over the dielectric layer.

However, Witek teach the method of forming a dielectric cap layer over the dielectric layer (fig. 24 with corresponding text).

It would have been obvious to those skilled in the art to form a dielectric cap layer over the dielectric layer as taught by Emesh / Witek for provides a capacitor structure and method of forming a capacitor structure which allows for integration of capacitor dielectrics.

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Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Emesh/Witek in view of Jain (US 5,494,854).

Emesh discloses the features out lined above, but does not show exactly a method wherein the step of forming the conductive layer includes depositing doped polysilicon.

However, Jain teaches the method wherein the step of forming the conductive layer includes depositing doped polysilicon (Table.2).

It would have been obvious to those skilled in the art using the polysilicon for forming conductive layer as taught by Emesh/Witek/Jain for provides process a capacitor structure and method of forming a capacitor structure which allows for integration of capacitor dielectrics including ferroelectric materials, and other dielectric materials of high dielectric strength, into capacitors in bipolar, CMOS, or bipolar CMOS integrated circuit fabrication processes. The method of forming the capacitor structure is adaptable to using various known methods of forming a capacitor dielectric comprising a ferroelectric dielectric material. The method requires a minimal number of additional process steps and mask levels to form a capacitor structure.

Claims 35, 39, 41 and 43 rejected under 35 U.S.C. 103(a) as being unpatentable over Emesh/ Witek in view of Jain (US 5,494,854).

Emesh/ Witek discloses the features out lined above, but does not show exactly a method wherein the step of forming the cap layer includes depositing a silicon oxide layer using a chemical vapor deposition method with tetra-ethyl-ortho-silicate (TEOS) or silicon dichlorohydride (SiH_2Cl_2) or silicon rich oxide (SRO) as the main reactive agent.

However, Jain teaches the method wherein the step of depositing a silicon oxide layer using a chemical vapor deposition method with tetra-ethyl-ortho-silicate (TEOS) or silicon dichlorohydride (SiH_2Cl_2) or silicon rich oxide (SRO) as the main reactive agent (col.2, lines 28-62).

It would have been obvious to those skilled in the art using the TEOS or $(\text{SiH}_2\text{C}_1_2)$ or SRO for forming silicon oxide cap layer as taught by Emesh/Witek/Jain for provides process including dielectric materials of high dielectric strength.

Claims 30 – 33 and 37 rejected under 35 U.S.C. 103(a) as being unpatentable over Emesh/ Witek/Jain in view of Tsai (US 5,981,379).

Emesh/ Witek/Jain discloses the features out lined above, but does not show exactly a method wherein the step of forming the dielectric layer (silicon dioxide) includes a high-density plasma chemical vapor deposition method or using a plasma-enhanced chemical vapor deposition method and depositing a silicon nitride layer using a chemical vapor deposition method.

However, Tsai teaches the method wherein the step of forming the dielectric layer (silicon dioxide) includes a high-density plasma chemical vapor deposition method or using a plasma-enhanced chemical vapor deposition method and depositing a silicon nitride layer using a chemical vapor deposition method (figs. 1A-1C and 4A-4E with corresponding text).

It would have been obvious to those skilled in the art using the high-density plasma chemical vapor deposition method or the plasma-enhanced chemical vapor deposition method for forming silicon oxide layer and depositing a silicon nitride layer using a chemical vapor deposition method as taught by Emesh/Witek/Jain/Tsai for provides process of forming a capacitor structure which allows for integration of capacitor dielectrics of high dielectric strength.

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Claims 34, 36, 38 and 40 are rejected as being prima facie obvious without showing that the claimed ranges (concentration, thickness, temperature, process time) achieve unexpected results relative to the prior art range.

In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA 1980) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Allowable Subject Matter

Claims 45-64 are allowed.

The following is an examiner's statement of reasons for allowance:

Prior art does not teach a method of forming a thin cap layer over the planar surface wherein the thin cap layer having a second thickness which is sufficient to fill scratches formed in the at least one dielectric layer during the polishing step, and which second thickness is substantially less than the first thickness.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor Yevsikov whose telephone number is (571) 273-1910. The examiner can normally be reached by telephone on Monday to Friday 7:15 AM to 4:45 PM (except second Mondays).


If attempts to reach the examiner by telephone are unsuccessful, examiner's supervisor, Matthew S. Smith, can be reached on (571) 273-1907. The fax phone numbers for the organization where this application or processing is assigned are (703) 305-3431 for regular communications and (703) 305-3431 for After Final communication.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 7033080596.

Victor Yevsikov



February 13, 2004


COMMUNICATIONS SECTION
FEB 13 2004